PENDING CLAIMS

40. A method of preparing a bioceramic composition, comprising:

mixing powders of a calcium phosphate and a promoter;

pressing the powders to form a compressed object of a predetermined shape; and

hydrating the compressed object to form a reaction product, the reaction product comprising a poorly crystalline apatitic calcium phosphate.

42. A composite material, comprising:

a strongly bioresorbable, poorly crystalline apatitic calcium phosphate in contact with a biocompatible supplemental material, said supplemental material present in an amount effective to impart a selected characteristic to the composite.

43. A bioceramic composition comprising:

a compressed powder object of a predetermined shape comprising powders of a calcium phosphate and a promoter, said promoter selected to promote conversion of the calcium phosphate into a strongly bioresorbable, poorly crystalline apatitic calcium phosphate.

103. A method for treating a bone defect comprising:

identifying a bone site for receiving an implant;

introducing a pressed powder object at the bone site, said pressed powder object comprising a calcium phosphate and a promoter and having approximately the shape required for repair of the bone defect, whereby the pressed powder object is converted in vivo into a strongly bioresorbable poorly crystalline apatitic calcium phosphate.

111. The method of claim 40 wherein said hydrating is characterized by an endothermic reaction.

112. The method of claim 40 wherein said hydrating further comprises incubating the compressed object at about 37 °C.

113. The method of claim 40 wherein said hydrating is carried out *in vivo*.

114. The method of claim 40, wherein said hydrating comprises using a hydration medium to hydrate the compressed object, wherein said hydration medium is selected from the group consisting of physiological fluids, serum culture medium, and tissue culture medium.

115. The method of claim 40, further comprising lyophilizing the reaction product.

116. The method of claim 40, further comprising contacting the powders with a biologically active agent.

117. The method of claim 116, wherein the biologically active agent is selected from the group consisting of antibiotics, bone morphogenic protein, bone regenerative proteins, and vaccines.

118. The method of claim 40, wherein the promoter is selected from the group consisting of calcium metaphosphate, dicalcium phosphate dihydrate, heptacalcium decaphosphate, tricalcium phosphates, calcium pyrophosphate dihydrate, crystalline hydroxyapatite, PCA calcium phosphate, calcium pyrophosphate, monetite, octacalcium phosphate, CaO, $CaC0_3$, calcium acetate, and H_2PO_4, and amorphous calcium phosphate.

119. The method of claim 40, wherein the promoter comprises dicalcium phosphate dihydrate (DCPD).

120. The method of claim 40 further comprising the step of mixing a supplemental material with the powders.

121. The method of claim 120 wherein the supplemental material is demineralized bone.

123. The method of claim 40 wherein said poorly crystalline apatitic (PCA) calcium phosphate is further characterized in that when at least one gram of said poorly crystalline apatitic (PCA) calcium phosphate is implanted at a rat intramuscular site, at least 80% of said poorly crystalline apatitic (PCA) calcium phosphate is resorbed within one year.

124. The method of claim 40, wherein the calcium phosphate comprises amorphous calcium phosphate.

125. The method of claim 43 wherein said poorly crystalline apatitic (PCA) calcium phosphate is further characterized in that when at least one gram of said strongly bioresorbable, poorly crystalline apatitic (PCA) calcium phosphate is implanted at a rat intramuscular site, at least 90% of said strongly bioresorbable, poorly crystalline apatitic (PCA) calcium phosphate is resorbed within one year.

126. The composition of claim 43, wherein the calcium phosphate comprises amorphous calcium phosphate.

127. The composition of claim 43 wherein the object further comprises a hydration medium to hydrate the object.

128. The composition of claim 127 wherein the hydration medium is selected from the group consisting of physiological fluids, serum culture medium, and tissue culture medium.

129. The composition of claim 127 wherein said conversion is characterized by an endothermic reaction.

130. The composition of claim 43 further comprising a biologically active agent.

131. The composition of claim 130, wherein the biologically active agent is selected from the group consisting of antibiotics, bone morphogenic protein, bone regenerative proteins, and vaccines.

132. The composition of claim 43, wherein the promoter comprises dicalcium phosphate dihydrate (DCPD).

133. The composition of claim 43, wherein the promoter is selected from the group consisting of calcium metaphosphate, dicalcium phosphate dihydrate, heptacalcium decaphosphate, tricalcium phosphates, calcium pyrophosphate dihydrate, crystalline hydroxyapatite, PCA calcium phosphate, calcium pyrophosphate, monetite, octacalcium phosphate, CaO, $CaC0_3$, calcium acetate, and H_3PO_4, and amorphous calcium phosphate.

134. The composition of claim 43 further comprising a supplemental material.

135. The composition of claim 134 wherein the supplemental material is demineralized bone.

136. The composition of claim 127 wherein said poorly crystalline apatitic calcium phosphate has an x-ray diffraction pattern comprising broad peaks at 2θ values of 26°, 28.5°, 32° and 33°.

137. The composition of claim 127 wherein said poorly crystalline apatitic calcium phosphate is further characterized in that when at least one gram of said strongly bioresorbable, poorly crystalline apatitic (PCA) calcium phosphate is implanted at a rat intramuscular site, at least 90% of said strongly bioresorbable, poorly crystalline apatitic (PCA) calcium phosphate is resorbed within one year.

138. The method of preparing a bioceramic composition, comprising:

mixing powders of a calcium phosphate and a promoter in a hydrating medium to form a paste, said promoter selected to convert the mixed powders into a poorly crystalline apatitic calcium phosphate;

introducing the paste into a mold of a predetermined shape; and

allowing the paste to harden to thereby obtain a poorly crystalline apatitic calcium phosphate article of a predetermined shape.

139. The method of claim 138, further comprising incubating the paste at about 37 °C.

140. The method of claim 138, wherein the hydrating medium is selected from the group consisting of water, physiologically acceptable pH-buffered solutions, saline solution, serum culture medium, and tissue culture medium.

141. The method of claim 138, further comprising lyophilizing the article.

142. The method of claim 138, further comprising contacting the powders with a biologically active agent.

143. The method of claim 142, wherein the biologically active agent is selected from the group consisting of antibiotics, bone morphogenic protein, bone regenerative proteins, and vaccines.

144. The method of claim 138, wherein the promoter is selected from the group consisting of calcium metaphosphate, dicalcium phosphate dihydrate, heptacalcium decaphosphate, tricalcium phosphates, calcium pyrophosphate dihydrate, crystalline hydroxyapatite, PCA calcium phosphate, calcium pyrophosphate, monetite, octacalcium phosphate, CaO, $CaC0_3$, calcium acetate, and H_2P0_4, and amorphous calcium phosphate.

145. The method of claim 138 further comprising a supplemental material.

146. The method of claim 145 wherein the supplemental material is demineralized bone.

147. The method of claim 138 wherein said poorly crystalline apatitic calcium phosphate (PCA) has an x-ray diffraction pattern comprising broad peaks at 2θ values of 26°, 28.5°, 32° and 33°.

148. The method of claim 138, wherein the calcium phosphate comprises amorphous calcium phosphate.

149. The method of claim 40, wherein the powders are compressed using a hydraulic press.

150. The method of claim 40, wherein the powders are compressed under a pressure in the range of about 500 psi to about 5000 psi.

151. The composition of claim 43, wherein the compressed powder object has a density ranging from about 1.2 g/cm^3 to about 2.0 g/ cm^3.